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SUBJECT: Corrective Measures Study Interim Report – Soil (July 2015);
GE Aviation - Evendale Facility

The Report named above has been submitted to the U.S. EPA by O'Brien & Gere Engineers, Inc. on behalf of the GE Aviation Facility. My understanding is that GE wants to submit certain sections of its planned complete CMS in advance as individual Reports to EPA. GE is requesting preliminary review of the individual Reports to ascertain EPA's opinion on the format, data presentation, and general conclusions. EPA could provide comments on the Reports, but those comments would be preliminary in nature and would not preclude EPA from requiring revisions and additional studies in order to complete or approve a full CMS Report.

At your request, I have performed an expedited review of the above document to get an understanding of how GE's CMS will plan to address the soil exposure pathway at the site. The stated approach is to employ conservative methodology to determine: a) identify Contaminants of Potential Concern that have a maximum soil concentration exceeding an EPA Regional Screening Level for Industrial Land Use; b) identify the current and future potential receptors and exposure routes for soil contaminants; and c) develop preliminary soil cleanup goals which will identify Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) which need to be further addressed in the CMS through soil Corrective Measures Objectives (CMOs) and an Institutional and Engineering Control Plan for the site.

My observations/questions and recommendations are focused on the following general topics addressed in the Report:

Section 1.2.1 Technical Approach

This Section outlines the approaches the Report will use to identify soil contaminants of concern based on conservative human health risk screening methodology and identify which SWMUs and AOCs need chemical contaminant "preliminary soil remediation goals" based on future anticipated land uses. It is noted that the stated purpose of the soil remediation goals is to develop soil Corrective Measures Objectives and Institutional and Engineering Controls which will be presented in a separate report. A Soil Management Plan will be submitted to show how compliance with the Institutional and Engineering Controls would be accomplished. Consequently, it appears that GE's proposal for contaminated soils is to manage soils "in place" and not conduct remediation by excavation or treatment. Only if the contaminated soils were to be disturbed by future activity would provisions for disposal of excavated soil be triggered. EPA would need to decide if this proposal to implement a Soil Management Plan is

acceptable to apply across the entire site for every SWMU or AOC. For example, Figures 3 and 4 show SWMUs and AOCs ranging in size from fractions of an acre to several acres. The Agency will need to decide if long-term management in place is an acceptable objective for all SWMUs which will have soil cleanup goals or if contaminant remediation is preferable at certain large SWMUs or for SWMUs where potential contaminant migration could be a problem or an uncertainty. (The stability or mobility of contaminants in SWMUs was not addressed in this Report but may have been addressed in the facility RFI documents.)

Section 2.1 SCREENING ASSESSMENT

General Approach

This Section explains that maximum concentrations of chemical contaminants in the SWMUs/AOCs designated in the RFI for further evaluation were compared to EPA Regional Screening Levels for industrial land use. That comparison was used to identify site-wide COPCs and which SWMUs/AOCs would need preliminary soil cleanup goals. That approach is valid to apply for the site. However, in addition to making conservative comparisons using maximum chemical contaminant concentrations, the revised Report or final CMS should describe the rationale that was used to decide that adequate sampling had been performed at the individual SWMUs and AOCs across the site. For example, was judgmental sampling conducted at SWMUs and AOCs in a manner that would increase the probability of sampling at the most contaminated locations within a SWMU/AOC and at depths which would evaluate the potential for contaminant migration in a SWMU/AOC? In addition, the final CMS could explain how conservative decisions were made in the RFI to retain SWMUs/AOCs to be addressed in the CMS.

This Section explains that Total Petroleum Hydrocarbons (TPH) were identified as a site COPC. Because the site sampling for TPH did not identify the distribution or relative fractions of aromatic or aliphatic TPH constituents by carbon number, a decision was made to use the minimum or most conservative RSL for the six representative fractions. Consequently, the RSL corresponding to the (aromatic–low) fraction was selected for preliminary screening of TPH soil concentrations. Does this mean that benzene or the BTEX (benzene, toluene, ethybenzene, and xylene) fraction of TPH was used as the surrogate to represent the concentration of TPH for risk screening purposes? Or, was the entire measured TPH concentration assumed to be benzene or some combination of BTEX for the purposes of conducting conservative risk screening? It is recommended that the final CMS provide additional explanation on which surrogate screening approach was employed and why the selected approach is a conservative method for conducting risk screening for TPH.

This Section states that SWMU 118 (Process Sewer System, shown on Figure 2) was not included in the quantitative screening because worker activities conducted in this SWMU are covered under Facility health and safety procedures and practices to mitigate human exposure to materials within the sewers. However, Figure 4 indicates that PCBs were detected above the site-specific cleanup goals at SWMU 118 and therefore this SWMU is retained for further evaluation in the CMS. In addition, it is likely that a determination is needed on whether PCBs found in the sewer system are subject to TSCA regulations for disposal, and what data is available (and needed) for PCB characterization (i.e., location and concentrations) in the sewer system.

Background Considerations

For evaluating metals as COPCs, the Report states that for naturally-occurring metals, a valid approach would be to compare site related metals concentrations to background levels of metals. A document released by Ohio EPA on background metals concentrations in Hamilton County, Ohio (OEPA 2015) was used to select background metals concentrations for comparison to GE-site measured metals concentrations. The OEPA study document was not attached to the current Report and EPA was not previously requested to review the OEPA study. Consequently, a few questions and observations are appropriate to make about the use of this background comparison:

1) Has GE conducted historic background metals soil sampling on the site, and if so, did EPA determine that such sampling was valid for making comparisons with SWMU and AOC soil sampling results?
2) The OEPA document may be valid to employ for background metals comparison subject to additional rationale which should be provided in the CMS. The CMS should provide rationale for why the OEPA study in Hamilton County is valid to apply to the GE site. For example, was the OEPA study focused on soils from natural unimpacted background areas (e.g. parks, woodlands) or were samples from potentially impacted areas also included (e.g., near roads, rights of way, commercial land)? Is it valid to directly compare the soil types sampled in the OEPA study to soils types found on the GE site? Are the GE site soils (i.e., within SWMUs and AOCs) reflective of local background soil types, and are GE site soils characterized by modified natural soil types such as industrial fill material?
3) The CMS should provide rationale for why the use of the data from the OEPA study would be a conservative approach for comparison to the GE site data. Why were 95%UTL values from the OEPA study employed, and how were the GE site sample data for metals compared to the OEPA study UTLs for the purpose of conducting background screening?

Section 2.2 DEVELOPMENT OF RISK-BASED SOIL CLEANUP GOALS

This Section describes the approach used to develop the site-specific, risk-based soil cleanup goals and the potential receptors to soils via incidental ingestion, dermal contact, and inhalation exposure pathways. Those are the valid direct contact pathways to address for developing soil cleanup goals. It is not apparent whether the soil contaminant-to-groundwater migration pathway was included in the site contaminant risk screening approaches. If not, how would that migration pathway be accounted for in the site contaminant data evaluation? Is it accounted for by the groundwater monitoring program for the site? In other words, do the groundwater monitoring locations within and/or downgradient of SWMUs and AOCs correspond with locations where soil-to-groundwater risk screening levels would likely be exceeded?

Section 3 SUMMARY AND CONCLUSIONS

Preliminary Soil Cleanup Goals – This Section summarizes the potential receptors and exposure pathways that need to be accounted for in the development of preliminary soil cleanup goals. The calculated soil cleanup goals are shown in Table 3. The Report states: *"In addition, cleanup goals exist for the Facility COPCs within the State of Ohio's Voluntary Action and BUSTR programs. These cleanup goals are also shown in Table 3. The CMS will evaluate the preliminary soil cleanup goals to be considered to be applicable for the Facility."* It is not clear why Ohio standards would be applicable cleanup goals for the GE facility which is not a voluntary action site and does not apparently have SWMUs or AOCs which are currently regulated for closure under the UST/LUST Program.

Table 1. Screening Evaluation Summary for SWMUs/AOCs

In regard to Column 4, what is the meaning of the term "Evidence of Release"? Does this mean there is evidence that contaminants were released beyond the known or suspected boundaries of the SWMU? Was sampling conducted outside of each such SWMU to define the limits of the release? Was the appropriate sampling already performed and reported in the RFI?

APPENDIX B

Exposure Parameter Estimates

The Report presents a well-designed description of the exposure parameters needed to calculate risk-based soil cleanup goals. The selected exposure input values are well documented and would be acceptable to use after consideration of the concerns described below.

Derivation of Soil Cleanup Goals (Tables B-1 through B-6)

These Tables present the algorithms for calculating soil cleanup goals for the soil exposure pathways (ingestion, dermal, inhalation) for each of the six expected receptor groups at the GE site. The lower part of each Table shows the chemical-specific soil cleanup goals calculated for the combination of exposure pathways for each receptor.

Total Petroleum Hydrocarbons (TPH) are listed as a COPC for each receptor. It appears that the non-carcinogenic endpoint for TPH is being modeled using benzene as the surrogate contaminant since the listed value for the TPH Oral Reference Dose (4.00E-03 mg/kg-day) and the listed value for the TPH Inhalation Reference Concentration (3.00E-03 mg/m^3) correspond to the published EPA RfD and RfC values for benzene. That surrogate approach is acceptable. However, in accordance with EPA risk assessment guidance and the Provisional Peer Reviewed Toxicity Values document for TPH (Reference: U.S. EPA 2009a), the low-aromatic fraction of TPH should also have a carcinogenic endpoint modeled using benzene as the surrogate contaminant. Consequently, TPH should also have carcinogenic endpoint cleanup goals calculated for the oral and inhalation exposure routes by employing the Oral Cancer Slope factor for benzene (5.5E-02 kg-day/mg) and the Inhalation Unit Risk for benzene (7.8E-03 m^3/mg). This addition should be made for each Receptor group subject to chronic duration exposure to TPH. (Benzene would also need to be included in the calculation of a chemical-specific Volatilization Factor for application to the carcinogenic and non-carcinogenic endpoints.)

Input Parameters for Estimating Soil Cleanup Goals (Tables B-7 through B-16)

For performing calculations to derive site-specific cleanup goals, Appendix B relies on a number of site-specific input values. For example, in order calculate a site-specific value for PEF and VF, a value for the parameter A_s (Aerial Extent of Potentially Affected Soil) is needed. A value of 400 acres was selected for this factor. However, that value corresponds to the acreage for the entire GE site (Section 1.1), and clearly does not correspond with the acreage associated with SWMUs and AOCs known to have contaminant levels above the most conservative RSL values. A more appropriate value for A_s would be the combined acreage for only the SWMUs and AOCs which need cleanup goals. That would correspond to a more realistic area to represent the lateral area from which contaminants could volatilize to ambient air. The final CMS should revisit this parameter and propose a modified value to apply for the

cleanup goal calculations. The modified value of A_s would need to be entered into the calculations of the PEF and VF parameters in order to determine the quantitative effect on the cleanup goals.

Regarding the calculation of site-specific soil cleanup goals (RGs) presented in Appendix B, it is difficult for this reviewer to compare the RG values calculated in this Report compared to the values which EPA would calculate, since this reviewer would employ the "RSL Calculator" found at the RSL web site (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). I used the RSL Calculator to perform some preliminary calculations of RG values for TCE using the GE selected site-specific input values shown in Table B-7, Table B-13, and Table B-15 for the Outdoor Industrial Worker scenario. My results indicated the calculation of lower (more conservative) RG values than the default case of RG values calculated without employing the site-specific inputs. For the final CMS, I recommend that we request GE to lead EPA through some of the RG calculations so that the project team can reach a consensus agreement on the results.

Please contact me if any clarification is needed for the comments presented above.